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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|---|---|---|---|---|
| 09/805,435 | 03/14/2001 | Victor I. Klimov | 01997-297001 | 2077 |

26171 7590 10/08/2002

FISH & RICHARDSON P.C.
1425 K STREET, N.W.
11TH FLOOR
WASHINGTON, DC 20005-3500

| EXAMINER |
|---|
| MENEFEE, JAMES A |

| ART UNIT | PAPER NUMBER |
|---|---|
| 2828 | |

DATE MAILED: 10/08/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

| Office Action Summary | Application No. | Applicant(s) | |
|---|---|---|---|
| | 09/805,435 | KLIMOV ET AL. | |
| | Examiner | Art Unit | |
| | James A. Menefee | 2828 | |

*-- The MAILING DATE of this c mmunication appears on the cover sheet with the correspondence address --*

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

1)☒ Responsive to communication(s) filed on *31 October 2001* .

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

4)☒ Claim(s) *1-56* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-56* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

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**Application Papers**

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

**Priority under 35 U.S.C. §§ 119 and 120**

13)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☒ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

**Attachment(s)**

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) *4,6* .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

## DETAILED ACTION

### *Response to Amendment*

In response to the preliminary amendment filed 31 October 2001, the specification has been amended. Claims 1-56 are pending.

### *Information Disclosure Statement*

The information disclosure statement filed 29 August 2001 fails to comply with 37 CFR 1.98(a)(2), which requires a legible copy of each U.S. and foreign patent; each publication or that portion which caused it to be listed; and all other information or that portion which caused it to be listed. It has been placed in the application file, but the information referred to therein has not been considered unless noted on the PTO-892. Note that the references on the second IDS, filed 13 August 2002 have been considered.

### *Claim Rejections - 35 USC § 112*

The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 40, 45, 51-52, and 55-56 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. There is insufficient antecedent basis for the limitations in these claims. Claim 40 should depend on claim 39, claim 45 should depend on claim 44, claim 51 should depend on claim 50, claim 52 should depend on claim 51, claim 55 should depend on claim 54, and claim 56 should depend on claim 55.

***Double Patenting***

The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. See *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970);and, *In re Thorington,* 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent is shown to be commonly owned with this application. See 37 CFR 1.130(b).

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

Claims 1, 4-11 and 14-56 are rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1-31 of U.S. Patent No. 6,322,901 in view of Hakimi et al. (US 5,260,957). Although the conflicting claims are not identical, they are not patentably distinct. '901 is claiming a single nanocrystal, while the present invention is claiming a group of these same nanocrystals that are grouped together, forming a gain medium for use in a laser system. The nanocrystals claimed in '905 exhibit photoluminescence. Hakimi teaches that it is well known that nanocrystals exhibiting photoluminescence, for example quantum dots, are often grouped together into a gain medium and formed into a laser. It would have been obvious to one skilled in the art to make a laser gain material out of quantum dots because quantum dot lasers give very good control of the laser emission wavelength, as taught by Hakimi.

***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1, 4-5, 9-12, 14-17, 21-25, 28-34, 37-39, 42-44, 47-50, 53-54 are rejected under 35 U.S.C. 102(b) as being anticipated by Hakimi et al. (US 5,260,957). Hakimi discloses the claimed invention as follows:

INDPENDENT CLAIMS

Regarding claim 1, Hakimi discloses a gain medium 12 comprising a concentrated solid including a plurality of semiconductor nanocrystals 14, wherein the solid us substantially free of defects.

Regarding claims 14 and 23, Hakimi discloses a gain medium 12 comprising a concentrated solid including a plurality of semiconductor nanocrystals 14. It has been held that the recitation that an element is "capable of" performing a function is not a positive limitation but only requires the ability to so perform. It does not constitute a limitation in any patentable sense. *In re Hutchison*, 69 USPQ 138.

Regarding claims 30 and 38, Hakimi discloses laser 10 comprising a gain medium 12 comprising a concentrated solid including a plurality of semiconductor nanocrystals 14. There is a cavity arranged relative to the gain medium to provide feedback.

Regarding claim 43, Hakimi discloses laser 10 comprising a gain medium 12 comprising a concentrated solid including a plurality of semiconductor nanocrystals 14. There is a cavity

arranged relative to the gain medium to provide feedback. The solid inherently provides gain to an optical signal at an energy equal to or less than the band gap emission of the nanocrystals, because the nanocrystals are providing the gain.

Regarding claim 48, the limitations are disclosed as in the rejection of claims 23 and 43 above.

Regarding claim 49, the claim is the method of normal operation of the device of claim 43, and therefore the limitations are inherently met through the normal operation of that device.

Regarding claim 53, the claim is the method of normal operation of the device of claim 30, and therefore the limitations are inherently met through the normal operation of that device.

DEPENDENT CLAIMS

Regarding claims 4-5, 16-17, 24-25, 34, 39, 44, 50, and 54, the nanocrystals are made of materials such as CdSe or ZnTe (col. 2 lines 7-10).

Regarding claims 9, 21, and 28, each nanocrystal has a diameter less than 10 nm (col. 2 lines 46-47).

Regarding claims 10-11, 22, 29, 37, 42, and 47, the nanocrystals may have a monodisperse distribution of sizes (col. 1 line 65 – col. 2 line 11).

Regarding claim 12, the gain medium may be provided on a substrate (col. 3 lines 55-64).

Regarding claim 15, the limitation is not given weight, as in independent claim 14 above.

Regarding claims 31-33, the solid is substantially free of defects, and there is an optical excitation source 20.

***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 2-3 and 13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hakimi. Hakimi discloses the limitations of the claims as shown above, but does not disclose the following:

Regarding claims 2-3, it is not disclosed that the solid contains greater than 10% by volume of nanocrystals. However, it is well known that the concentration of quantum wells of a solid gain material will affect the amount of gain provided when it is optically pumped. It would have been obvious to one having ordinary skill in the art at the time the invention was made to make the solid this specific width, since it has been held that discovering an optimum value of a result effective variable involves only routine skill in the art. *In re Boesch*, 617 F.2d 272, 205 USPQ 215 (CCPA 1980).

Regarding claim 13, it is not disclosed that the substrate be made of glass, or that the thickness of the solid of nanocrystals be greater than about 0.2 microns. It is well known that gain media may be formed on glass substrates. It would have been obvious to one having ordinary skill in the art at the time the invention was made to make the substrate of glass, since it has been held to be within the general skill of a worker in the art to select a known material on the basis of its suitability for the intended use as a matter of obvious design choice. *In re Leshin*,

125 USPQ 416. It is well known that the width of a solid gain material will affect the amount of gain provided when it is optically pumped. It would have been obvious to one having ordinary skill in the art at the time the invention was made to make the solid this specific width, since it has been held that discovering an optimum value of a result effective variable involves only routine skill in the art. *In re Boesch*, 617 F.2d 272, 205 USPQ 215 (CCPA 1980).

***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to James A. Menefee whose telephone number is (703) 605-4367. The examiner can normally be reached on M-F 8:30-5.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Paul Ip can be reached on (703) 308-3098. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 872-9318 for regular communications and (703) 872-9319 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.

JM
September 30, 2002

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